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ABSTRACT

A study was made to determine to what degree teachers, trained in the use of the Hunter Instructional Model, appropriately used the skills and strategies taught by the model, and what influenced the application of the learned skills in the classroom. Fourteen first through fourth grade teachers in two elementary schools participated. The Instructional Skills Observation Instrument was used to measure the teachers' ability to apply four instructional skills: anticipatory set, instruction, guided practice, and independent practice. Each teacher was observed four times, twice teaching reading and twice teaching mathematics. The teachers then participated in three full-day inservice sessions, scheduled once a month, to be trained in the Hunter scientific teaching model. The training consisted of presentation of theory, modeling of the skills, practice with feedback, and on-site coaching. Subsequent observations indicated that the teachers as a whole were able to appropriately apply the skills and strategies they had been taught. Interviews, inservice evaluations, classroom observations, and field notes identified several intervening and school context variables that appeared to influence the application of the skills in the classroom. (JD)

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IMPLEMENTATION OF THE HUNTER INSTRUCTIONAL MODEL: A STAFF DEVELOPMENT STUDY

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Abstract

Implementation of the Hunter Instructional Model:
A Staff Development Study

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The purpose of this investigation was two-fold: (1) to determine to what degree teachers trained in the Hunter science of teaching model appropriately applied the skills and strategies of the model, and (2) to determine what intervening and school context variables influenced the final outcome. The sample for the study was comprised of fourteen first through fourth-grade teachers in two elementary schools. An observation instrument called the Instructional Skills Observation Instrument (ISOI) was designed to measure teachers' ability to apply four instructional skills (anticipatory set, instruction, guided practice, and independent practice). For the pretest, each teacher was observed four times, twice teaching reading and twice teaching math. Following the pretest the teachers participated in three full-day inservice sessions scheduled once a month. These sessions were designed to train teachers in the Hunter scientific teaching model. The training processes used for the training followed a pattern of (1) presentation of theory, (2) modeling or demonstration of the skills, (3) practice with feedback, and (4) on-site coaching. Posttesting was conducted in the same manner as the pretest. Using the Paired-t Test, t values for the mean difference scores were found to be significant at the .05 level. This statistical test indicated that the teachers as a whole were able to appropriately apply the skills and strategies which they had been taught. Interviews, inservice evaluations, classroom observations, and field notes were used to collect qualitative data for the second part of the study. Identified were several intervening and school context variables which appeared to influence the application of skills in the classroom. Excerpts from the narrative records were used to illustrate teacher and trainer perceptions of those elements which appeared to facilitate or hinder the implementation of skills.

Introduction

The purpose of the investigation of educational efforts should be to add to the understanding of classroom teaching and learning and increase the likelihood that the research outcomes will be utilized by practitioners to improve educational practice in a timely manner. Studies to determine the effectiveness of training teachers to use certain behaviors need to investigate and document not only the training but should move beyond to a broader and more powerful conception of how and under what circumstances these skills are internalized and applied (Little, 1982).

One effort to operationalize research findings and to train teachers to use those behaviors found to be effective has been a model developed by Madeline Hunter at the University of California, Los Angeles. Hunter's science-of-teaching model forms the basic instructional content of the staff development programs of California's Teacher Education Computer Centers (TECC), and in addition, is being used in varying degrees by hundreds of schools, districts and county offices across the United States.

If the impact of this particular model is measured by the enthusiasm of teachers and administrators regarding the training, the program has been highly successful. However, if other measures of effectiveness are applied, e.g. application of behaviors in the classroom or changes in teacher-student interaction, the results are largely unknown. Has the Hunter model been effective in changing the behaviors of teachers in classrooms? Which components of the training are being implemented and to what degree? What are the qualitative (human and environmental) factors that influence implementation of strategies? These are empirical questions that this study attempted to answer thereby increasing the relevance and utility of research to educational practitioners.

Statement of the Problem

The purpose of this study was two-fold: (1) to determine to what degree the training of teachers to utilize appropriately certain skills and strategies had its intended effect on the teachers' actual classroom behaviors, and (2) to determine what intervening and context variables influenced the final outcome. Quantitative data collected for the first part of the study was designed to provide data regarding the teachers' ability to implement appropriately the skills and strategies that were taught during inservice sessions. Qualitative data collecting measures were utilized for the second part of the study to identify those training components and environmental context variables that contributed to or detracted from the implementation of the skills and strategies taught.

Overview

The educational community has long been engaged in a search for the instructional methodologies most conducive to maximizing student achievement. Today this search has been intensified by increasing demands for accountability indicative of the public's growing dissatisfaction with our educational system. Compounding the problem are the dual issues of declining enrollment and decreasing monies available for educational enterprises (Morgan, 1982).

Policy makers in schools find themselves faced with a dilemma; how to affect quality instruction for students in an environment characterized by dwindling resources and public discontent. Many school administrators, because the largest portion of their budgets of necessity is allocated for human resources, have begun to view staff development as a potent and economical method of improving instructional programs (McLaughlin and Marsh, 1978).

Given the hundreds of staff development programs available in today's market, choosing the most effective program for a particular site is often difficult. A staff development effort must take into account the curriculum (content) and delivery system of the model, the level of teacher expertise, feelings and attitudes of the teachers, the social context of the school and a myriad of other interconnecting parts (Griffin, 1982). Administrators seeking direction in selecting programs for their schools need data which take into account all these variables.

School managers in their search for the most effective content and delivery system for their staff development efforts, need information about not only what specific strategies can be taught to improve teaching but also need identified the requirements and characteristics for successful integration of these strategies.

Selection of Content Variables

A model of teaching which has been widely implemented across the United States is the science-of-teaching model of Madeline Hunter at UCLA. This model has provided for the operationalization of many theoretical findings into practical classroom applications.

Hunter proposes that the essential focus in teaching is not on what a teacher is but what a teacher does. Through a search of the psychological literature, Hunter has identified certain principles that research has established as having the potential to affect learning. She has delin ated those teacher decisions and behaviors which incorporate these principles. Hunter contends that all decisions which generate teaching behaviors fall into three categories: (1) decisions and behaviors that are related to the selection of the learning objective, i.e. "what" is to be learned; (2) decisions and behaviors that determine the behavior of the learner, i.e. what he/she will do to learn; and (3) decisions and behaviors that determine those actions of the teacher designed to facilitate learning; i.e. the "how" in the process of teaching (Hunter, 1978).

Together these categories of teacher decisions form a matrix of interacting elements which when translated into action, make student learning "more probable, more efficient, more predictable, and more economical" (Hunter, 1971).

Hunter has proposed an analogy to teaching of Piaget's conceptualization of the inability of children to evaluate perceptual data in terms of a system of coordinates. Piaget's concept that the position and orientation of objects can be brought into relation one with another only when the learner has internalized a system of coordinates--a reference system within which perceptions may be organized and where certain stationary objects serve as reference points for mobile ones--suggests to Hunter a simila: schemata of coordinates for the teaching-learning process.

She has theorized that a vertical axis consists of the incremental nature of the learning task itself where learning proceeds from the less complex to the more complex, from easier to more difficult. On this axis each learning is a synthesis of certain essential "sub-learnings." The learner's position on this incremental vertical axis is based on what he/she already knows (which constitutes the foundation for what he will learn next). This establishes one fixed point of reference for all teaching. Hunter categorizes behaviors and decisions which assure maintenance on the correct point of the vertical axis as (1) teacher and student behaviors are focused on the intended objective, (2) the objective is at the correct level of difficulty and complexity for the learner, and (3) the teacher monitors student progress and makes necessary adjustments which leads to achievement of the intended objective (Hunter, 1978).

The horizontal axis in the teaching-learning process consists of certain principles of learning which apply to all levels on the vertical axis. Hunter categorizes these research-validated principles as those which: (1) affect motivation to learn; (2) affect the rate and degree of earning; (3) affect retention of learned material; and (4) affect transfer of learning to any situation where it is appropriate. Hunter states that if the correct placement on the vertical axis is assumed, successful achievement is more dependent on the valid application of the principles of learning in the teaching process than on I.Q., family background, previous experience, or other outside-of-school factors. On the horizontal axis involving these principles of learning, Hunter proposes that perceptions of the effectiveness or ineffectiveness of teaching-learning behaviors can be used as reference points to determine whether (1) principles of learning incorporated by the teacher facilitate learning and/or (2) certain principles of learning are being ignored or misused and thereby interfere with learning (Hunter, 1978).

With this system of educational coordinates, Hunter reports that educators can pursue the more productive question of "given this learning task to be achieved (the vertical axis), which learning principles (horizontal axis) will facilitate its achievement for this particular learner (mobile data which changes from learner to learner and from time to time with any one learner)?" (Hunter, 1978)

According to Hunter, this science-of-teaching model provides an articulated basis for making and sequencing teaching decisions as well as suggests facilitating teacher and student actions, thereby enabling teachers to perceive and interpret what they are doing in order to more efficiently predict, promote, and control learning.

The skills which form the core of the Hunter science-of-teaching model--selecting an objective at the correct level of difficulty, task analyzing the objective, diagnosing the learner, and prescribing learning tasks appropriate for the learner--are skills which are not readily observable in the classroom setting. However, whether or not the teachers indeed utilize these processes can be observed in the teaching act itself. Hunter suggests that there are four major components to be considered in teaching an effective lesson which encompass and draw upon this larger arena of instructional skills (Hunter, 1978). These four components--anticipatory set, instruction, guided practice, and independent practice--were selected as the variables to be included in this investigation.

Selection and Implementation of Training Processes

The four major processes of effective staff development identified by Joyce and Showers (1980) formed the basis for the training component of this study. A summary of their work is presented in table 1.

TABLE 1

A MODEL FOR EFFECTIVE INSERVICE TRAINING

Training Components	Skill Acquired (%)	Skill Applied (%)
Presentation of Theory	10-20	5-10
Demonstration	35	5-10
Practice and Feedback	80	5-10
Coaching	90	90

1. Presentation of Theory

The content of the science-of-teaching model was presented to the teachers and principals in three, one-day inservice sessions spaced three to four weeks apart. Lectures and discussions were used to provide teachers with the rationale, conceptual base, and potential uses of each instructional technique. According to the research conducted by Joyce and Showers (1980), this presentation of theory is essential to raise teachers' awareness and conceptual control of the content. In the training, the presenters were careful to model for the teachers the instructional skills they were teaching. Modeling tends to increase the credibility of claims that the ideas were effective and practical as well as increase teacher understanding of the instructional practice (Little, 1981).

2. Demonstration

After each instructional technique or strategy was presented, an enactment of that technique occurred either through a live demonstration with students, or adults or through videotape. Often more than one demonstration was utilized. The purpose of the demonstrations was to increase mastery of the theory and potential for transfer of the skills to classroom practice. Many research studies of staff development indicate that demonstration is likely to be an important component of any training program aimed at the acquisition and transfer of skills (Joyce and Showers, 1980).

3. Practice and Feedback

Each inservice session included time for teachers to practice the new skill or strategy. These practice situations were achieved in part by trying out the new practices with peers, simulating as closely as possible the actual

conditions under which these strategies and skills would be applicable. Teachers received feedback from both presenters and peers as to the effectiveness of their practice. At the close of each session, teachers were given "homework" assignments designed to provide practice of the new skills and strategies in their own classrooms. At the beginning of each succeeding session, time was set aside for teachers to discuss and share the results of their practice. Stallings (1982) has found this technique effective in increasing teachers' progressive command over new ideas and practices. Teachers also received follow-up visits from the presenters between inservice sessions. These visits provided teachers with additional feedback on their efforts to implement the instructional skills.

4. Coaching

Direct coaching, or feedback to teachers on their application of skills in the classroom setting, formed the fourth process component of the training. This was determined to be a critical component if transfer of skills was to occur. Joyce and Showers (1982) state, "few teachers having obtained skill in a new approach, will then transfer that skill into their active repertoire and use the new approach sensibly unless they receive additional information." They continue to cite findings from their claim that while presentation, demonstration and practice with feedback are essential if a skill is to be obtained, little will be accomplished unless coaching is included. Berliner (1982) concurs with the findings of Joyce and Showers stating, "the number of people who will change by exposure to books and lectures is just too small."

In this investigation coaching took several forms: (1) formal pre-arranged classroom observations and feedback by the trainers, (2) clinical supervision follow-up visits by the principals at each school, (3) formal and informal follow-up visits and feedback by a person hired specifically for that purpose, and (4) informal visits by the teachers to each other's classrooms, and (5) discussion among teachers participating in the training.

Methodology

Because this study sought to determine not only if teachers were able to implement skills they had been taught but also to understand and and delineate the conditions and variables which affected the implementation of skills, a mutually reinforcing set of quantitative and qualitative methods were utilized.

A quasi-experimental one group pretest-posttest design was selected to measure implementation of skills. Because this research design offers minimal control, (there is no assurance that the treatment is the only factor affecting the difference between pretest and posttest), an additional qualitative research methodology was chosen to supplement the more traditional hypothesis- testing design. This approach relied on ethnographic techniques such as participant observation, in-depth interviews, detailed descriptions, and field-notes kept by the primary investigator and several associates. The use of these two research methodologies in conjunction with one another has been suggested as providing more complete and useful information than an exclusive emphasis on one design because it focuses on both outcomes and processes (Burden, 1982). Its was also assumed that the thorough documentation of phenomena occurring between pretest and posttest would allow for more generalization of the results due to more complete data.

Instrumentation and Data Collection

An observation instrument called the Instructional Skills Observation Instrument (ISOI) was designed and field tested. The instrument measured instructional facility in anticipatory set, instruction, guided practice and independent practice. The instrument was designed to determine not only if the teacher included each of the above components in a lesson, but whether or not they were utilized when needed and in an appropriate manner.

Six observers were selected and trained to use the ISOI. Proficiency using the Hunter model was deemed critical to being able to score teachers correctly. Therefore, the criteria for the selection of the observers were: (1) previous training as a classroom teacher in the Hunter science-of-teaching model, (2) effective implementation of the model in their own classrooms as observed by the principal investigator, and (3) experience in training other teachers to use the model.

The six observers participated in three days of training designed to instruct them in the use of the ISOI. The training included practice with videotaped lessons and in actual classrooms. Also included in the training were procedures for observing in actual classrooms with a minimum of disruption. As a part of the training, the ISOI was pilot-tested in classrooms. The pilot testing resulted in an interrater reliability of .755. Due to the fact that the scoring of this instrument involved some subjectivity, this reliability figure was determined to be acceptable (Gay, 1981).

Using the ISOI, each teacher was observed four times in early February 1983 and four times in late May 1983. The observations, two each time in reading and two in math, lasted fifty to sixty minutes each and were scheduled at least three days in advance. Each teacher was observed by at least two different observers.

Several qualitative data collecting methods were utilized for this study. (1) Teachers and principals completed written evaluations of both content and process of each of the four inservice sessions. (2) Structured forms for follow-up were designed and completed by the principal investigator and associates. (3) Field notes were kept which included data about informal classroom visits, conversations with individual teachers and principals, requests by teachers for assistance, and the observers' perceptions of attitudes and school climate. At the conclusion of the training, each teacher was surveyed using a structured interview form.

Findings

The ISOI is comprised of four components each measuring facility in a separate instructional skill. These are the ability to provide: (1) an anticipatory set, (2) instruction, (3) guided practice, and (4) independent practice. Each teacher received separate scores on each of the four components and an overall score which was a sum of four component scores. The total number of points possible for each lesson observation was eighty-eight. For the pretest and the posttest, each teacher was observed four times, twice teaching reading and twice teaching math. Therefore, it was possible to obtain a total pretest or posttest score of 352.

To determine the difference between teachers' ability to utilize the Hunter science-of-teaching model before and after inservice training, the mean of the sum of the teachers' total pretest scores and the mean for each of the four components of the Instructional Skills Observation Instrument (ISOI) were calculated. Next the mean of the sum of their total pretest scores and the mean for each of the four components of the ISOI were determined and compared to the pretest means using the Paired t-Test.

Table 2 presents the findings of the ISOI.

TABLE 2

Findings of the ISOI - Mean Difference Scores on Anticipatory Set Instruction, Guided Practice, Independent Practice and Combined Scores

Component	Mean Difference Score	Standard Deviation	Standard Error/Mean	t Value	1-tail Prob.
Anticipatory Set	16.33	15.07	4.35	3.75	.002
Instruction	16.54	22.43	6.47	2.56	.013
Guided Practice	17.33	19.42	5.61	3.09	.005
Independent Practice	12.21	6.54	1.89	6.46	.001
Combined Scores	62.42	46.83	13.52	4.52	.001

Although these findings indicate that the teachers were successful in implementing the skills and strategies taught, they do not reveal what factors contributed to this success. These factors were as much a concern of this investigation as were the final outcomes.

To address this concern, several research questions were designed to discover what context and intervening variables were involved in producing the statistical outcomes. Two of the research questions dealt with which components of training were implemented most frequently and least frequently. Those elements most frequently observed in the classrooms of participating teachers were those which were practical in nature. That is, teachers were found to implement those skills and strategies that were easy to understand and had an immediate, observable effect on the day-to-day operations of the classroom. These components included checking for student understanding, using transition activities labeled "sponges," and providing an anticipatory set for a lesson. Those components least frequently utilized were the more cognitively sophisticated teaching practices presented in the training. Components falling in this latter category were task analysis and teaching to an objective--structuring a lesson so that all student and teacher behaviors were relevant to the objective.

Another research question was concerned with the appropriateness of the application of skills. The data indicated that most of the teachers demonstrated the ability to utilize the skills and strategies in an appropriate manner--when their use was indicated. This was essentially a decision-making skill and was deemed critical to the effectiveness of training. A few teachers had difficulty utilizing the skills and strategies in an appropriate manner. They sometimes included in a lesson all elements that had been taught whether or not their use was indicated.

Teachers' perceptions as to which skills were most difficult and least difficult to implement were the focus of two additional research questions. Those skills which were found to be less frequently implemented were the same skills which teachers perceived to be most difficult--task analysis and teaching to an objective. Teachers found these skills difficult to conceptualize and therefore difficult to apply. Teachers were nearly unanimous in their perceptions regarding the skills that were easiest to implement. They reported that the lesson design (anticipatory set, instruction, guided practice, and independent practice) was not only the easiest to apply but was the most useful to them in their teaching.

Still another research question asked which sources of coaching teachers perceived to be most effective in facilitating their implementation of strategies or skills. The coaching provided by the staff development trainers was seen as most helpful, however, many teachers felt that the coaching by peers was also extremely useful in assisting them to internalize the skills. The least helpful form was perceived to be coaching by the school principals. It is important to note that the two principals in this study were both skilled in the coaching of teachers. That they were not perceived to be as effective in providing feedback as were the trainers may be due to the design of the study. Because there were four persons who provided rather intensive feedback to teachers, it is likely that the principals did not perceive their primary role to be that of providing instructional feedback; at least not during the time the study was being conducted.

The final two questions were concerned with school context and training process variables connected with the study and teachers' perceptions of their effects. Those context variables perceived to be facilitating were supportiveness of school staff and principal's efforts to attend to physcial needs. Those seen as impeding implementation of teaching practices were "open" classrooms, large numbers of low ability students, and no clear school-wide curriculum. Training process variables perceived as facilitating were the organization and expertise of trainers, modeling by the trainers of skills being taught, and grade level practice sessions held during inservice sessions. The processes which teachers felt hindered their application of skills were too little time to internalize the material and working with teachers of different grade levels and sessions.

Additional findings which resulted from the qualitative data collection and not addressed by the research questions concerned teachers' ability to apply the lesson design and teacher attitudes. It was discovered that the lesson design was more difficult to apply in reading instruction than in math. This appeared to be due to the structure of reading lessons which often include several objectives. A positive change in teachers' attitude toward the training was discovered which had not been hypothesized at the beginning of the study.

Linkage Between Qualitative and Quantitative Data

There appear to be several strong linkages between the qualitative data collected from the inservice evaluations, classroom follow-up visits, interviews with teacher, field notes and the quantitative data generated by the ISOI observations. Following are eight tentative hypotheses which attempt to clarify these linkages.

1. The content of the Hunter science-of-teaching model itself appears to be practical and valid which may account in part for its successful implementation.

In all of the qualitative data results, the effectiveness of the Hunter science-of-teaching model is cited by teachers. "I now teach two pages carefully rather than 'cover' four.", "I'm much more aware and knowledgeable about what I'm doing.", and "It [the model] helps me know where kids are and what to do if they're having trouble" are examples of teachers' comments about the Hunter model. The interviews revealed that teachers perceive this approach to teaching to be sequential, systematic, and ultimately very workable in helping them improve instruction for their students.

2. The training processes utilized for this study were effective in assisting teachers to apply the skills and strategies of the Hunter science of teaching model.

The evaluations, interviews and classroom observations revealed that not only did teachers value the manner in which the training was conducted, but also understood why these processes were effective for them. The credibility of the instructional strategies appeared to be enhanced by the trainers' use of these same strategies in training the teachers. Instructional processes, to be truly applicable, ought to be effective with any age group and in any setting. This was assumed to be the case in this study. The processes used in this investigation followed closely those outlined by Joyce and Showers in their research on inservice training (presentation of theory, modeling or demonstration and practice with feedback) (Joyce and Showers, 1980). They also paralleled the functions of teaching which Rosenshine found to be effective with students (Rosenshine, 1982). That teachers recognized and were able to verbalize how critical these processes were to their own understanding and ability to apply, is further evidence of their effectiveness.

3. The on-site coaching of teachers is a critical factor in their ability to apply new instructional skills.

On site coaching of teachers as they attempted to put into practice those skills and strategies taught in the inservice sessions, was observed by all persons involved in the study to be an essential ingredient of the teaching/learning process. The data from the interviews disclosed that many teachers felt they would not have used, or would not have used as effectively, the skills taught had they not received individualized assistance in applying these skills in their classrooms. Coaching appeared to be useful for several reasons: (1) it facilitated the practice of new skills, (2) it provided for technical assistance, and (3) it assisted teachers in adapting generic skills to their own specific situations. These findings confirm those of Joyce and Showers (1983) regarding the functions coaching performs.

4. Teachers' self-confidence and sense of efficacy increases as they become competent in the application of effective instructional strategies.

In addition to teachers' statements regarding their feelings of increased self-confidence and sense of efficacy, there existed in the qualitative data numerous other indicators supportive of this hypothesis (e.g. interest in being videotaped, sharing of lesson plans, openness to observation). A partial explanation for this may have been that previous to training and observation, teachers had seldom received feedback on their teaching performance. Given the relatively numerous occasions during which teachers were observed during this study, the amount of feedback increased dramatically. Much of this feedback was quite positive. Teachers learned they were doing many things very effectively. This brought to a conscious level the many teaching behaviors that were being performed intuitively, and perhaps led to an increased sense of being more in control of the teaching process.

The increased sense of self-confidence and sense of efficacy may also have evolved from the fact that the teachers' repertoire of teaching practices expanded during this study, providing them with new resources to meet instructional demands. This quite possibly could have contributed to the teachers' sense of control and confidence in their ability to teach well.

5. Given a supportive setting, teachers' attitudes toward training and coaching appear to undergo a positive change over time.

Every effort was made in this study to provide a positive, supportive environment that would facilitate teacher growth and development. Teachers received numerous opportunities to give input into the design and content of the inservice sessions. Observations were for the most part scheduled at teachers' convenience. Teachers' concerns and questions were addressed as specifically and as immediately as possible. Trainers attempted to be sensitive to teachers' feelings, responding in a non-threatening and non-defensive manner. Finally, all who were involved in the training and observation of teachers made every effort to identify and positively reinforce productive teacher behaviors and attitudes. Teachers' comments during the interviews indicate they were aware of these efforts and appreciated them.

The principals of the two schools certainly contributed to the supportive context of this effort. They displayed an awareness of the demands that were being placed on teachers and responded by making changes in the school environment that accommodated teachers' needs. The principals also gave support to the training by participating in all inservice sessions with the teachers. This allowed them to discuss issues and to give specific positive feedback to teachers during their classroom visitations.

6. A knowledge level understanding of an instructional practice does not necessarily indicate an ability to apply that practice appropriately.

The data collected for this study clearly pointed out that teachers' perceptions of their understanding of a concept or practice was not the same as their ability to use it in an appropriate manner. Even though the teachers' evaluations of the training were quite positive and often indicated an understanding of the skills and strategies presented, observations in classrooms often revealed inappropriate or incorrect application of these practices. The Hunter science-of-teaching model does not present "recipes" to

be followed line for line, but emphasizes a decision-making process where practices are selected depending upon need. It is understandable that teachers might initially apply practices inappropriately given the complexity of the teaching process and the time needed to internalize and try out new skills. This was probably particularly true in this investigation. The short duration of the study (three months) did not allow time for the intensive practice which in most cases is necessary to apply a new practice appropriately in a variety of situations.

7. Teachers have more difficulty applying the more complex instructional skills (e.g. task analysis) than those simpler, more practical lesson-specific skills (e.g. anticipatory set and guided practice).

A few of the instructional skills which form the core of the Hunter science-of-teaching model are relatively complex and are more "theoretical" in nature. They are essential to effective teaching but are more often mental processes performed by the teacher before the actual teaching of students begins. The skill of task analysis falls in this category. Task analysis is seldom observed in a classroom per se, however, the teaching behaviors which result from task analysis (sequential presentation of the lesson components) are readily observable.

The qualitative and quantitative data revealed similar findings regarding teachers' internalization and use of this skill. It was perceived by teachers to be not as useful as other skills and its results were not observed as often during classroom visitations as other skills. The reasons why this occurred are hypothesized to be two-fold. First, as one teacher suggested, it is possible in some instances given years of experience teaching a concept or skill and given well-writen teachers' guides, the sequential presentation of a concept was already occurring which rendered task analysis unnecessary. A second reason may be that task analysis is a cognitively sophisticated skill and needs to be treated more in depth than usually happens. Although considerable time for presentation was allotted to this skill during training, it may not have been sufficient. Little time was spent with individual teachers conducting task analyses for specific skills that they were teaching. The practice which teachers did receive was massed; that is it all occurred within a relatively brief time span. It is probable that more distributed (spaced out over time) practice with task analysis was needed. Teachers also indicated that they could have used many more examples of task analysis conducted in a variety of content areas.

On the other hand, those simpler skills which occur as part of the actual teaching act (e.g., providing an anticipatory set or checking for student understanding) appeared to be much easier for teachers to apply and indeed were observed frequently during classroom visitations. Teachers commented that these skills appeared to them to be easier to understand and apply. They are also strategies that are relatively unique and infrequently included in teacher's guides or other supplementary instructional materials. In the training, these skills are easy to teach, easy to demonstrate and easy to practice.

8. The structured lesson plan format is generally more difficult to apply in reading instruction than in math.

Data from classroom observations and interviews with teachers clearly pointed out that teachers were more successful applying the lesson design while instructing in math than during reading.

Two factors appear to have influenced the findings regarding use of the lesson design in the content areas of reading and math. The first is the content itself. Observations in classrooms and discussions with teachers reveal that instruction in math usually involved a single objective. (E.g. the learner will add two-digit numerals with regrouping in the one's column.) The lesson plan format lends itself well to teaching this type of single objective. Reading instruction frequently assumes a different structure. While conducting a small reading group, the teacher often has multiple objectives dealing with work recognition, comprehension, phrasing, etc. Since the lesson plan format is designed primarily for teaching one new objective, teachers trying to adapt this format to the typical reading lesson with more than one objective naturally experienced some difficulty.

The second factor which may have accounted for teachers' difficulty in applying the lesson design in reading instruction was a training process variable which perhaps was unique to this study. It was observed by both trainers and teachers that most of the examples and demonstrations of the lesson design used math as the content area. In the interviews several teachers mentioned that they needed more examples of application of the lesson design to reading instruction. If indeed demonstration and modeling are as essential to understanding and application of skills as this study indicates, and if application in reading is more difficult, then it would have been appropriate to provide more examples and demonstrations in this content area.

Conclusion

It is important to note that while this study resulted in positive findings, there is a problem of generalizing the findings from this present research to other settings, content, or training modes. There is no assurance for example, that the modes of coaching utilized in this study would be as effective in the context of some other staff development model or with other content. It also cannot be guaranteed that teachers' self-confidence or sense of efficacy would increase (as it appeared to increase in this study) given content other than the skills and strategies included in the Hunter model.

A second caveat regards coaching. The data from this investigation suggest that some form of coaching is necessary for appropriate application of skills in the classroom setting. It is not known if similar results might have been achieved with less or no coaching. While coaching is strongly recommended by various researchers, it is time-consuming and expensive. More needs to be known about its value under various conditions.

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